AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111
Serial Number: 10/562,189
Filing Date: October 9, 2007
Title: CLUSTERED VARIATIONS-AWARE ARCHITECTURE

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REMARKS

Applicant respectfully requests reconsideration of this application in view of the following remarks and the above amendments. This response is believed to fully address all issues raised in the Office Action mailed November 13, 2008. Furthermore, no new matter is believed to have been introduced hereby.

Claims 1-30 were previously pending. Claims 1, 7-9, 23, 25, and 28 have been amended. Claims 6, 22, and 26 have been canceled without prejudice or disclaimer. Accordingly, claims 1-5, 7-21, 23-25, and 27-30 remain pending.

35 USC §§ 102 and 103 Rejection of the Claims

Claims 1-3, 5-6, 9-10, 13-22 and 25-30 were rejected under 35 USC § 102(b) as being anticipated by University of Rochester, (WO 2004066092).

Claims 1-3, 9-12, 25 and 28-30 were rejected under 35 USC § 102(b) as being anticipated by Georgiou et al. (U.S. Patent No. 6047248).

Claims 4, 7-8, 11-12 and 23-24 were rejected under 35 USC § 103(a) as being anticipated by University of Rochester, (WO 2004066092) in view of Advanced RISC Machines , International Publication Number (WO 2004/084070).

Each of these rejections is respectfully traversed since the cited art, alone or in combination, fails to teach or suggest the claimed combination of features such as set forth in any of the pending claims.

Taking claims 6, 22, and 26 as an example, the Office rejects these claims by stating:

figures 2 and 3 and at page 15, lines 1-22. Regarding claims 6, 22 and 26,

University of Rochester discloses speculative execution (using DAGs and

histograms to predict slack and calculate the minimum frequency and voltage to

permit the clock domain to minimize slack and operate at maximum efficiency) at

page 21, lines 7 – page 22, line 1 and at page 23, lines 1-8. Regarding claims

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The cited portion of University of Rochester states:

> Whenever an event in the dependence DAG has two or more incoming arcs, it is possible—in fact likely—that one arc will constitute the critical path and that the others will have "slack". This slack indicates that the previous operation completed earlier than necessary. If all of the outgoing arcs of an event have slack, then we have an opportunity (assuming zero-cost scaling) to save energy by performing the event at a lower frequency and voltage. With each event in the DAG we associate a power factor whose initial value is based on the relative power consumption of the corresponding clock domain, as determined by parameters in Wattch. When we stretch an event we scale its power factor accordingly. Calculations are made on a relative basis, on the assumption that energy is proportional to the square of the clock frequency. The stretching phase of our reconfiguration tool uses a "shaker" algorithm to distribute slack and scale edges as uniformly as possible. Since SimpleScalar, like any real processor, executes events as soon as possible subject to dependences and hazards, slack always appears at the ends of non-critical paths in the original execution trace. The shaker algorithm thus begins at the end of its 50K cycle interval and works backwards through the DAG. When it encounters an event whose outgoing edges all have slack, the shaker checks to see whether the power factor of the event exceeds a certain threshold, originally set to be slightly below the maximum power of any event in the graph. If so (this is a high-power event), the shaker scales the event until either it proceed through two additional analysis phases. The first phase uses the DAG as inpu

As can be seen, the cited text only appears to discuss tree analysis for relative power consumption; namely, attempting to perform operations that end sooner than expected at a lower power consumption configuration. On the contrary claim 6 for example states:

> 6. The method of claim 1, further comprising:
>
> comparing a speculative output of a pipeline stage with an expected output from the pipeline stage; and
>
> determining whether the speculative output matches the expected output.

As can be seen, claim 6 is directed at comparing two different outputs of thee same pipeline stage, one being a speculative output and the other being the expected output. Also, even if as the Office alleges the cited text teaches "speculative execution" the cited portion still fails to indicate comparison of a speculative output of a pipeline stage with an expected output from the pipeline stage, and further the determination of whether the two outputs match. Analysis is simply not the same of comparison of two outputs of the same stage such as claimed.

Without limiting the scope of embodiments of the invention, only in an effort to impart precision to the claims (e.g., by more particularly pointing out embodiments of the invention, rather than to avoid prior art), and merely to expedite the prosecution of the present application, Applicant has amended independent claim 1 to in part recite substantially the language of claim 6 with the further clarification that the pipeline stage is the claimed processor's pipeline stage and further by replacing "expected output" with "correct output".

It is respectfully submitted that the cited art, alone or in combination, clearly fail to teach or even suggest the claimed combination of features such as set forth in claim 1, including for example, the claimed comparison and determinations such as discussed above.

The remaining independent claims recite similar (though not identical) language and have been rejected for similar reasons as claim 1. Hence, these remaining independent claims should be allowable for at least similar reasons as claim 1, as well as additional or alternative elements that are recited therein but not shown in the cited prior art.

Also, all pending dependent claims should be allowable for at least similar reasons as their respective independent claims, as well as additional or alternative elements that are recited therein but not shown in the cited prior art.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney (303.800.6678) to facilitate prosecution of this application.

Applicant hereby petitions, as well as includes the appropriate fee herewith, to obtain a two-month extension of the period for responding to the Office action, thereby moving the deadline for response from February 13, 2009, to April 13, 2009.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 50-4238.

Respectfully submitted,

CUSTOMER NUMBER: 50890

Telephone Number: 303.800.6678

Date___April 13, 2009___   By ____/Ramin Aghevli – Reg. No. 43,462/_____
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